

Limit-Feeding Can Improve Feed Efficiency of Beef Cattle

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Abstract

The price of corn has increased significantly over the past several years resulting in a dramatic rise in production costs for the beef industry. Most beef cattle in the United States are finished on high corn diets, therefore, that industry strives to achieve maximal efficiency to reduce costs of production. Previous research has indicated that cattle undergo compensatory growth when fed excess energy after a period of limited energy intake. We investigated the effects of limit-feeding cattle to achieve a target gain of 1.1 kg/d for 90d followed by 75d of offering feed ad libitum on performance and carcass quality measures. After the entire 165d feeding period, limit-fed (LF) cattle had 3% lower ($P = 0.07$) dry matter intake and 5% higher ($P = 0.02$) average daily gain, resulting in a 7% greater ($P < 0.0001$) gain to feed ratio when compared to cattle offered feed ad libitum (AF). This equates to a \$9.24 savings per steer. Limit feeding did not alter hot carcass weight, marbling score, and Quality Grade ($P > 0.05$). The LF treatment decreased ($P < 0.01$) backfat (24%) and Yield Grade (13%) as compared to the AF treatment. These results indicate that more desirable carcasses can be produced with increased efficiency by initially limit-feeding cattle during the finishing period. Producing high quality beef with lower feed inputs would greatly benefit the industry, especially with the increasing feed costs.

Introduction

As the cost of feed increases, the beef industry strives to find ways to improve the efficiency of production. Cattle can achieve compensatory gain when fed ad libitum after a period of limited energy intake at the initiation of the finishing period (Schoonmaker et al., 2004). There is also evidence the feeding low dietary concentrations of vitamin A for a minimum of 145 during the finishing period will improve site of fat deposition in beef cattle via increasing intramuscular fat without increasing backfat (Gorocica-Buenfil et al., 2007a,b).

Hypothesis and Objective

I hypothesized that restricting energy intake during the first 90 days of the finishing period in combination with low dietary vitamin A concentration would improve overall feed efficiency of beef cattle while improving carcass composition.

The objective of this study was to investigate the interactions of limit-feeding beef cattle at the initiation of a finishing period and dietary vitamin A concentration on growth rate, feed efficiency, and carcass composition.

Materials and Methods

Animals, Treatments, and Design

◆168 Angus-based steers
(BW = 285 kg)

◆24 pens of 7 steers
allotted by initial BW



◆2 x 2 Factorial arrangement of treatments
◇Vitamin A

NA: No supplemental Vitamin A

SA: 2,200 IU of Vitamin A/kg dietary DM

◇Energy Feeding Program

LF: Limit-fed to achieve gain of 1.1 kg/d for 90d
followed by 75d offering feed ad libitum

AF: Offered feed ad libitum for 165d

◆Basal diet (75% High Moisture Corn)

◇1,300 IU/kg DM Vitamin A equivalents from
β-carotene

◆Pen feed intake calculated daily



◆Harvest after average of 165 days on feed

◆Carcass characteristics measured after
a 48h chill included:
Hot carcass weight, marbling score,
backfat, Quality Grade, Yield Grade

Statistical Analysis

◆Data analyzed using the MIXED procedure in SAS
◇Completely Randomized Design experiment
◇2 x 2 Factorial arrangement of treatments
◇No main effect interactions
◇Only main effects of energy feeding program will be
presented

Results

Table 1. Carcass Measures

	Treatment		
	LF	AF	P value
Hot carcass weight (kg)	780	777	0.71
Backfat (cm)	1.1	1.4	0.007
Yield Grade	3.0	3.4	0.01
Marbling score (small = 500-599)	527	524	0.88
Quality Grade (5 = low choice, 6 = ave. choice)	5.7	5.5	0.24

Table 2. Cattle Performance

	Treatment		P value
	LF	AF	
Dry matter intake (kg/d)	8.0	8.2	0.07
Gain:Feed (g/kg)	212	228	< 0.0001
Average daily gain (kg/d)	2.12	2.01	0.02

Conclusions

◆Same hot carcass weight + same marbling score + same Quality Grade = no change in carcass value

◆Less backfat + lower Yield Grade = potentially increased carcass value

◆Lower dry matter intake + higher average daily gain = increased feed efficiency

◆Decreasing the vitamin A content of the diet did not result at improved Quality Grades or marbling scores when fed in combination with energy restriction

◆Limit-feeding can decrease cattle production costs by increasing efficiency of gain and producing leaner high-quality beef products

Impact

◆Increased feed efficiency during the finishing period due to limit feeding for 90 d resulted in a savings of \$9.24 /steer



References

- Gorocica-Buenfil et al. 2007a. J. Anim. Sci. 85:2243-2255.
- Gorocica-Buenfil et al. 2007b. J. Anim. Sci. 85:3355-3366.
- Schoonmaker et al. 2004. J. Anim. Sci. 82:137-148.